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EDITORIAL

The impact of renal dysfunction on the outcome of patients with myocardial infarction: Does gender really matter?

KEYWORDS
renal dysfunction;
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gender;
primary coronary angioplasty

In recent years, intensive research has focused on the interplay between heart and kidney function. An important example is the recently described cardiorenal syndrome, which highlights the effects of acute or chronic dysfunction of one structure on the other.[1] However, apart from heart failure, the dynamic interaction between heart and kidneys holds crucial clinical and prognostic significance in a wide spectrum of cardiac disorders (e.g., coronary heart disease, cardiomyopathies) where renal dysfunction may affect cardiac function.[2-4] The important question of whether prevention or effective treatment of renal impairment can improve outcomes in patients with concomitant cardiac disorders is still awaiting a definitive response.[4]

In the context of coronary artery disease, the coexistence of chronic kidney disease is a familiar scenario. The presence of common risk factors such as hypertension, diabetes mellitus and atherosclerosis may account for this combination.[4]

Patients hospitalized for acute coronary syndromes with underlying chronic kidney disease have a higher risk of adverse outcomes.[5] The overall contribution of impaired renal function to these outcomes is emphasized by the widely used GRACE risk score (a validated calculation of six-month mortality in acute coronary syndrome), where baseline creatinine value is the fifth-highest predictor of death.[6,7]

Previous studies have addressed the impact of renal dysfunction in patients with acute ST-elevation myocardial infarction (STEMI) undergoing primary percutaneous coronary intervention (PCI). In this setting, among a cohort of more than 9,000 patients, advanced chronic kidney disease (at least stage 3, but not on dialysis) was independently associated with significantly worse in-hospital outcomes (unadjusted mortality 23.4%, vs 4.2% in the group without advanced kidney disease) even after adjustment for comorbidities.[8] Similarly, data from the HORIZONS-AMI trial revealed that STEMI patients with renal impairment undergoing primary PCI had higher long-term rates of death (18.7% vs. 4.4%, $p < 0.0001$) and major bleeding (19.3% vs. 6.7%, $p < 0.0001$) than did patients with normal kidney function. More specifically, in multivariable analysis, baseline creatinine emerged as an independent predictor of death at the three-year follow-up (HR = 1.51).[9]

To identify gender differences in the prevalence and prognostic impact of kidney function impairment in the setting of STEMI, 1,638 patients undergoing primary PCI were assessed in one study.[10] Women were found to suffer from kidney dysfunction more frequently than men in this study (42.3% vs. 25.3%, $p < 0.001$). This manifested in a two-fold relative increase of female in-hospital mortality (Odds Ratio 2.12, $p < 0.001$). In multivariable analysis, impaired renal function emerged as an independent predictor of in-hospital mortality in both genders (OR = 2.39, $p = 0.007$).

In a similar single-center study of 274 STEMI patients undergoing primary PCI, a higher prevalence of renal insufficiency (defined as estimated glomerular filtration rate (eGFR) <60 ml/min) among females was confirmed

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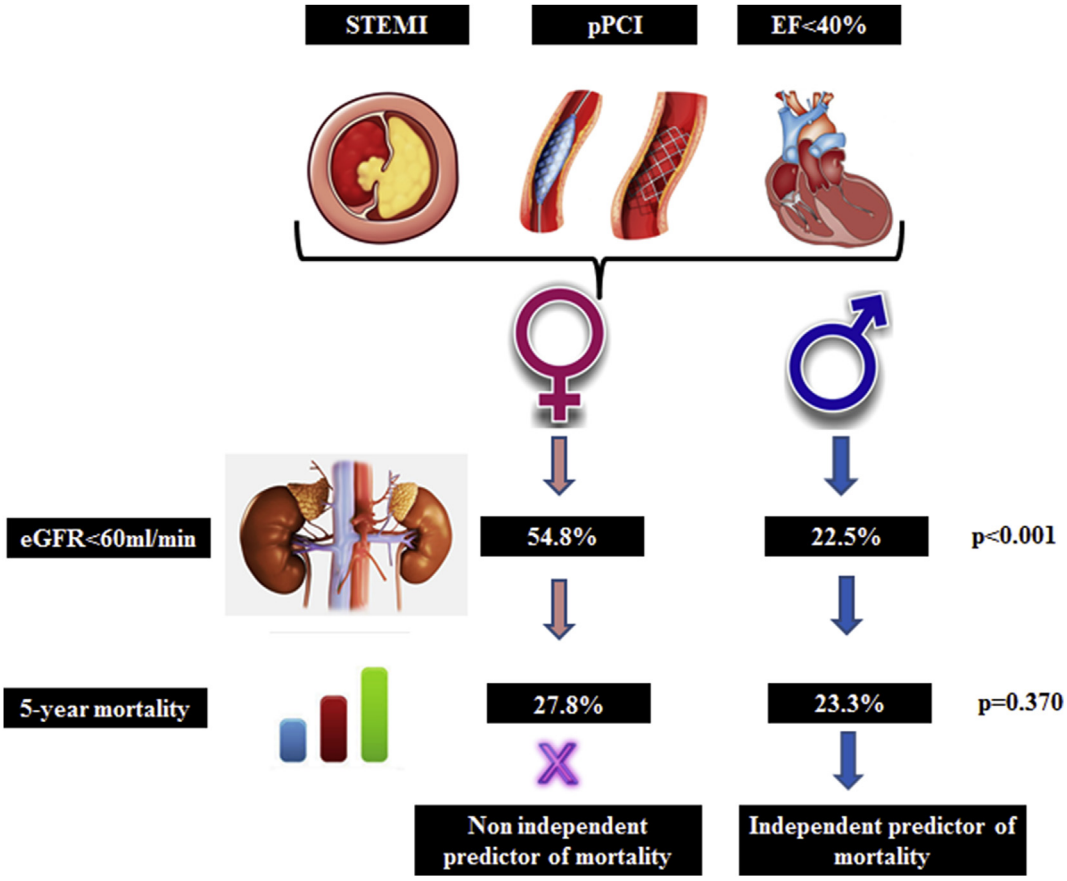

Figure 1 Schematic representation of the highlights of the Savic L et al. study. STEMI = ST elevation myocardial infarction, pPCI = primary percutaneous coronary intervention, EF = ejection fraction, eGFR = estimated glomerular filtration rate.

(67% vs. 26%, OR = 5.06). Interestingly, an association between eGFR increase (by 10mL/min) and reduction of one-year mortality was noted among the women studied, (OR = 0.39) but not the men.[11]

In this issue of the *Hellenic Journal of Cardiology*, Savic L. et al. assessed the prognostic contribution of chronic kidney disease (defined as eGFR<60mL/min) to five-year all-cause mortality in men and women with STEMI undergoing primary PCI.[12] The novelty of this investigation consists of both the inclusion only of patients with impaired left ventricular systolic function (ejection fraction <40%) and, most importantly, the extended length of follow-up. The study population consisted of 348 patients (29.8% women). In accordance with previous observations, chronic kidney disease was more common in women than in men (54.8% vs. 22.5%, $p < 0.001$), and female gender emerged as an independent predictor of renal dysfunction. No significant difference in five-year all-cause mortality was found between men and women (27.8% *vs* 23.3%, $p = 0.370$), whereas in multivariable analysis, chronic kidney disease was an independent predictor of five-year mortality only in men. This finding is inconsistent with the results of other available studies, however, and needs confirmation from study of larger populations. The highlights of the latter study are summarized in Fig. 1.

In conclusion, renal dysfunction is more prevalent in female versus male STEMI patients undergoing primary PCI. Renal function impairment confers adverse outcomes in both genders. The poor outcome in patients with renal dysfunction is multifactorial, with contributions including the high prevalence of concomitant risk factors, the greater risk of contrast-induced nephropathy and the higher risk of bleeding.[13] Nonetheless, it is not completely clear why the incidence of renal dysfunction is higher in women than in men.

Conflict of interest

The authors declare that they have no conflict of interest

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